CLAIMS

What is claimed is:

1. A critical path delay based macro energy model creation method comprising the steps of:

establishing an energy macro table;

determining bit width scaling functions for scaling between different bit-widths;

determining a normalizing period scaling function to estimate the normalizing period for different bit widths; and

estimating the power consumption for a particular circuit.

2. The critical path delay based macro energy model creation method of Claim 1 in which said energy macro table comprises a three dimensional table.

3. The critical path delay based macro energy model creation method of Claim 2 in which said dimensions include a normalized average toggle rate for the inputs (TRin) to a circuit block, an average static probability for the inputs (SPin) of the circuit block, and a normalized average toggle rate for the outputs (TRout) from the circuit block.

4. The critical path delay based macro energy model creation method of Claim 1 wherein said bit width scaling function is a polynomial function created to scale the energy per event between different bit widths.

5. The critical path delay based macro energy model creation method of Claim 1 further comprises the step of generating energy per event values corresponding to average characteristic parameters for a sample number of varying bit width circuits.

6. The critical path delay based macro energy model creation method of Claim 1 wherein a power value is utilized to establish said energy per event table.

7. The critical path delay based macro energy model creation method of Claim 6 wherein the power number is multiplied by the normalization period for each bit width.

8. The critical path delay based macro energy model creation method of Claim 7 wherein said normalization period is 1.2 times the critical path delay of the circuit block.

9. The critical path delay based macro energy model creation method of Claim 8 further comprising the step of creating two polynomial scaling functions, one for bit widths less than the bit-width selected for constructing the energy table, and the other for bit widths greater than the selected bit widths.

10. The critical path delay based macro energy model creation method of Claim 9 wherein said scaling function is obtained using the least square error method.

11. The critical path delay based macro energy model creation method of Claim 9 further comprising the step of conditioning the scaling function.

12. The critical path delay based macro energy model creation method of Claim 9 further comprising the step of utilizing a scaling function which has a negative second order term.

13. The critical path delay based macro energy model creation method of Claim 9 wherein said scaling function to estimate the normalization period for different bit widths is a polynomial constructed for an implementation of the module in a particular technology at a particular optimization point.

14. The critical path delay based macro energy model creation method of Claim 9 wherein the normalization period is a multiple of the critical path delay.

15. The critical path delay based macro energy model creation method of Claim 14 wherein the multiple is 1.2.

16. The critical path delay based macro energy model creation method of Claim 1 wherein the power value is scaled for different bit width translations

according to the bit width scaling function and the typical normalization period scaling function.

17. A power consumption estimation method comprising the steps of;

establishing input values;

calculating the typical clock period;

normalizing toggle rates;

looking up energy per toggle event;

performing bit width scaling; and

converting an energy estimate into a power dissipation estimate.

18. A power consumption estimation method of Claim 17 wherein the energy per event table parameters include bit width, absolute TRin, absolute TRout, and SPin.

19. A power consumption estimation method of Claim 18 wherein the TRin and TRout are normalized at the module input/outputs based on the calculated clock-period.